

## SECTION 652

### SEEDING AND MULCHING

#### 652.1-DESCRIPTION:

This work shall cover all operations incidental to the establishment of grass and legume vegetation, including the furnishing and sowing of seed, furnishing and applying fertilizer, agricultural limestone, and mulch material, all in accordance with these Specifications and at locations indicated on the Plans or designated by the Engineer.

#### 652.2-MATERIALS:

Materials shall meet the requirements in the following Subsections of Division 700:

MATERIAL	SUBSECTION
Ground Agricultural Limestone	715.25
Fertilizers	715.26
Mulch Materials	715.27
Inoculating Bacteria	715.29
Matting for Erosion Control	715.24
Water	*

\*Water shall be reasonably free from injurious chemicals and other toxic substances harmful to plant life. The source of water used is subject to the approval of the Engineer.

Temporary seed, such as annual ryegrass (Italian ryegrass) and weeping lovegrass, used in the seed mixtures B, C, or D, shall be of a commercial grade meeting the requirements of the State Seed Law. Temporary seed labeled with the notation "germination below standard" shall not be used. Temporary seed shall not be used after one year from date of germination test shown on the label.

Seed other than that specified above shall meet the requirements of 715.28.

Asphalt for anchoring mulch shall be of a commercial grade. Chemical mulch binders shall conform to the requirements in 715.27.1.

Topsoil, if called for, shall conform to the requirements in 651. All materials will be subject to approval or rejection, in part or in whole.

## CONSTRUCTION METHODS

#### 652.3-SEASON OF WORK:

Permanent seeding or second and third seeding following the original

## **652.4**

seeding, under 652, shall be performed between the dates of March 1 to June 15 and August 1 to October 15. Seeding under 642 shall be applied following construction at any time the weather will allow seeding equipment to operate; without regard to seasons.

### **652.4-AREA PREPARATION FOR SEEDING AND MULCHING:**

Seeding and mulching shall not be applied until the specified areas have been brought to lines and grades shown on the Plans. Topsoil, when called for, shall be spread to the depths indicated on the Plans.

The application rate for agricultural limestone will be determined by a pH test after cuts and embankments are completed just prior to seeding. The Plans will show the estimated tons (megagrams) of lime needed for the job based on general knowledge of the soils in the area. The final application rate will be determined by the Engineer based on the pH test, conducted in accordance with MP 700.04.10.

Interchanges, medians and similar areas with 3 to 1 slope or flatter, excluding areas involving subsurface drainage from base course material, shall be scarified sufficiently to produce a seed bed as directed by the Engineer. All large sticks, brush, loose roots, stones exceeding 2 inches (50 mm) approximately in any dimension, and other debris shall be removed prior to seeding operations. The area shall be back dragged to eliminate depressions, ruts, or equipment track marks on slopes. Seed bed preparation will not be necessary on slopes steeper than 3 to 1.

**Preparation of Lawn Type Area for Seeding:** All areas to be seeded to "Type C-2" lawn mixture, and "Type C-1" mixture in rest areas shall be fine graded. The finished grade shall be uniform and free of irregularities or water pockets. The finished grade shall be free of weed and plant growth, stones over 1 in. (25 mm) in diameter, or other debris. This debris will be disposed of as directed by the Engineer. Immediately prior to seeding, all areas shall be cultivated to provide a reasonably firm but friable seedbed. The depth of tillage shall be 3 inches (75 mm) or as directed by the Engineer. Limestone as required and fertilizer as specified shall be worked into the upper 3 inches (75 mm) of the seedbed before seeding.

### **652.5-SOWING SEED:**

Immediately following area preparation, seed shall be sown. Legume seed shall be inoculated with approved cultures, in accordance with the instruction of the manufacturer. When using a hydroseeder, the inoculant shall be increased to five times the normal rate.

Seed shall be sown by approved methods which provide for uniform distribution of seed. Rates of application and type of seed mixture shall be in accordance with Table 652.5 unless otherwise specified on the Plans.

For lawn areas, the broadcast seeding shall be made in two applications, using one half the seed each time and the second sowing to be at right angles to the first. After broadcasting or otherwise applying the seed, the seedbed shall be firmed by means of a roller or cultipacker.

**TABLE 652.5-SEED MIXTURES**

VARIETY OF SEED	Type B	Type C		Type D	Type L
		C-1	C-2		
	Medians, Shoulders (Ditch Slope) Waterways, and Mowable Areas of Interchange	Coarse Lawn Grass ***** For Use in Urban and Rest Area Locations	Fine Lawn Grass ***** For Use where a Fine Lawn is Desired	Cut and Fill Slopes ***** (Including Benches and Bifurcated Median)	All areas
	Lb. per acre (kg per ha)	Lb. per acre (kg per ha)	Lb. per acre (kg per ha)	Lb. per acre (kg per ha)	
Kentucky 31 fescue	65 (72.9)	45 (50.4)		20 (22.4)	
Red fescue (Pennlawn)	20 (22.4)	20 (22.4)	20 (22.4)	20 (22.4)	41 (46.0)
Kentucky bluegrass		25 (28.0)	40 (44.8)		
Merion bluegrass			30 (33.6)		
Crownvetch				20 (22.4)	
Hard Fescue Mixture***					63 (70.6)
White Dutch Clover	3 (3.4)				
Annual ryegrass August 1 to May 15  or  Weeping lovegrass May 15 to August 1	7 (7.8)      3 (3.4)	7 (7.8)      3 (3.4)	7 (7.8)      	7 (7.8)      3 (3.4)	12 (13.5)      5 (5.6)

\* Areas will be considered mowable when slopes are 3 to 1 or flatter. Type C-1 and C-2 seed mixtures shall be used in all urban, suburban, and rest

## 652.6

areas where lawn type turf is desired with moving maintenance intended.

C-2 lawn mixture shall be used along sidewalks, adjacent to private lawns.

\*\*\*A combination of approved certified varieties with no one variety exceeding 50% of the total hard fescue component.

**Reseeding, Refertilizing and Remulching:** Any area failing to establish a stand due to weather conditions or adverse soil conditions shall bereseeded, refertilized and remulched as directed by the Engineer.

### 652.6-APPLYING MULCH AND FERTILIZER:

**652.6.1-General:** Whenever permanent or temporary seeding is made on bare soil or newly completed construction work, the following criteria shall be followed in regard to mulching.

Straw mulch (including hay) shall be used on all areas and slopes 1½ to 1 or flatter. Wood cellulose fiber mulch shall be used on cut slopes steeper than 1½ to 1. The Engineer may make adjustments in the type of mulch to meet local conditions on the job.

The seed may be sown before or after the straw is spread. However, when the seed is sown first, the straw shall be placed within 24 hours.

When permanent seeding follows a temporary cover crop, wood cellulose fiber mulch shall be used and the quantity of mulch shall be determined by the amount of living and dead plant residue on the soil surface in accordance with 652.6.3.2.

Where the temporary seeding has been destroyed by subsequent construction, the mulch will be the same type and amount as required for bare soil or new construction.

**652.6.2-Straw Mulch:** Straw shall be applied at the rate of approximately two tons per acre (4.5 Mg per hectare). The straw mulch may be anchored with 100 gal. of asphalt per acre (93.5 L of asphalt per hectare). The asphalt may be sprayed on the straw as it leaves the blower or it may be applied in a separate operation. The Contractor shall be responsible for any damage to the structures from the asphalt spray.

Straw mulch around buildings, sidewalks or other structures may be held in place with a form of netting or may be sprayed with asphalt by hand while protecting the structures from the asphalt spray.

Other types of chemical mulch binders may be substituted for asphalt material. These mulch binders shall be applied according to the manufacturers' specifications through the asphalt spray system or by an agricultural crop sprayer.

### 652.6.3-Hydraulic Application of Wood Cellulose Fiber as a Mulching Agent:

**652.6.3.1-Equipment:** Hydraulic equipment shall be used for the

application of a slurry of fertilizer, seed, prepared wood cellulose fiber, and water. This equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, and water. The slurry distribution lines shall be large enough to prevent stoppage. This discharge line shall be equipped with a set of hydraulic spray nozzles which will provide even distribution of the mixture or slurry in the various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gal (3 750 L). and shall be mounted on a traveling unit which may be either self-propelled or drawn, with a separate unit which will place the slurry tank and spray nozzles within sufficient proximity to the areas to be seeded to provide uniform distribution without waste.

**652.6.3.2-Preparation of Slurry and Application of Fertilizer, Seed, and Mulch:** Wood cellulose fiber shall be applied at a minimum rate of 1,500 lbs. (1 680 kg) net dry weight per acre (ha) when seeding bare soil or new construction. When seeding into a residue or growth where temporary seeding has previously been performed, the rate will be determined by the Engineer, usually 1,000 lbs. net dry weight per acre (1 120 kg per ha). The seed, fertilizer, wood cellulose fiber, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by the hydraulic seeding method. The agitator shall be operating at a rate sufficient to keep all materials in suspension at the time such material is added. Seed shall be added first, shall be thoroughly mixed, and the fertilizer then added and put into suspension. When the tank is 40 percent full, the mulch material may be added and shall be in complete suspension by the time the tank is 75 percent full. Such increased mixing speed as is necessary for putting the entire admixture in suspension shall be maintained until the tank is emptied. Spraying may commence at such time as the full complement of water has been mixed into the slurry. It is the intent of this Specification to maintain the slurry, during the spraying operation, as a homogenous mixture of suspended solids in the tank until the tank is emptied.

**652.6.4-Fertilizer:** The kind and amount of fertilizer per acre (ha) shall consist of any type with 1-2-1 ratio (nitrogen, phosphoric acid, and potash) providing the minimum nutrient equivalent of 1,000 lb. (450 kg) of 10-20-10. In addition, 300 lb. per acre (335 kg per hectare) of slow release urea formaldehyde fertilizer shall be added whenever second step seeding and fertilizing is not feasible due to the Contract completion date. When hydraulic seeding methods are used, the fertilizer shall be applied concurrently with the seeding and mulching operation as part of the slurry mix. When commercial fertilizer is applied by the spray or hydraulic method, it need not be worked into the soil.

Fertilizer applications for second and third step seeding shall be in accordance with 652.8.

#### **652.6.5**

**652.6.5-Wood Chips:** Wood chips, recovered from clearing and grubbing operations, or bark will be acceptable as a mulch for seeding and shall be used at a rate of 35 cu. yd. per acre (66 cubic meters per hectare) in lieu of straw or hay.

#### **652.7-MAINTENANCE OF SEEDED AND MULCHED AREAS:**

The Contractor shall maintain all seeded areas until final acceptance of the project. All areas shall be protected from equipment traffic and any damaged areas shall be repaired and reseeded.

#### **652.8-SECOND AND THIRD STEP SEEDING, FERTILIZING AND MULCHING:**

The Engineer will require second or third step seeding, or both, depending upon the completion date and estimated completion time of any remaining items on the project.

The second application of fertilizer, seed and mulch shall be applied as directed by the Engineer. The application rates will be based on the stand of grass, severity of erosion and condition or growth of grass as described. Spring seedings shall be refertilized and reseeded as needed in the fall from August 15 to October 15. Fall seeded areas shall be given a second step seeding and fertilizing, as required, the following spring from March 15, to May 15.

The following shall be used as a guide for second step application:

- i. For areas with less than 50 percent stand or subject to sever erosion, apply the complete amount of seed, fertilizer, and mulch (wood cellulose fiber) as specified in the original seeding.
- ii. For areas with over 50 percent of grass and slight to moderate erosion, apply one half the original fertilizer and seed. If erosion is a problem apply one half the original wood fiber mulch.

The third step seeding, mulching, and fertilizing shall consist of spot application on areas not showing a satisfactory stand after the second step application. The quantity of material will be determined on the same basis as for the second step application. No urea formaldehyde fertilizer will be needed for third step seeding.

#### **652.9-METHOD OF MEASUREMENT:**

Ground agricultural limestone, fertilizer, and mulch will be measured by the ton (megagram). Seed will be measured by the pound (kilogram).

Wood chips or bark will be measured by the cubic yard (meter). It is assumed that 17.5 cu. yd. (14.75 cu. m) of chips or bark are equal to one ton (megagram) of straw for seeding. Wood chips or bark mulch will be measured by truck load or other loose volume measurement, and payment will be made on one ton (megagram) equivalent of straw for each 17.5 cu. yd. (14.75 cu. m) of wood chips or bark mulch.

Second and third step seeding operations will be measured and included for

payment under items in 652.11.

Asphalt for anchoring mulch, or other chemical mulch binders, will not be measured separately, but their cost shall be included in the unit price bid for mulch.

#### **652.10-BASIS OF PAYMENT:**

The quantities determined as provided above, will be paid for at the contract unit prices bid for the items listed below, which prices and payments shall be considered full compensation for furnishing all materials and performing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

Topsoil will be measured and paid for in accordance with the provisions of 651.

The bid price for fertilizer is based on 10-20-10 type. When other types of fertilizer are used, pay quantities will be determined using the following table.

<b>TYPE OF FERTILIZER</b>	<b>ACTUAL QUANTITY USED POUNDS (kg)</b>	<b>PAY QUANTITY POUNDS (kg)</b>
5-10-5	100	50
8-16-8	100	80
10-20-10	100	100
12-24-12	100	120
15-30-15	100	150

When fertilizer types other than those shown above are used, the relationship between the pay quantity and the actual quantity used will be established by the Engineer.

#### **652.11-PAY ITEMS:**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>UNIT</b>
652001-*	AGRICULTURAL LIMESTONE	TON (MEGAGRAM)
652002-*	FERTILIZER, "type"	TON (MEGAGRAM)
652003-*	SEED MIXTURES, "type"	POUND (KILOGRAM)
652004-*	"type" MULCH	TON (MEGAGRAM)

\*Sequence number